



NASA COST ESTIMATING AND ANALYSIS IMPROVEMENT PLANS

Overview

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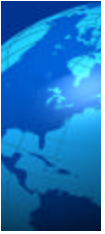
March 2, 2000





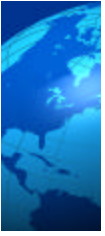
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History

- **NASA's parametric cost analysis capability has grown from its beginning in the mid - 1960s**
- **However, the attrition of the cost estimating staff and the reduction in capabilities, resulted in an effort to develop a cost analysis competency improvement plan or strategy**
- **Formulation of the Intelligent Synthesis Environment (ISE) program with the Cost and Risk Management element**
- **Establishment of the System Management Offices (SMOs)**
- **IPAO designated the lead for cost estimating and analysis with the responsibility to provide the improvement plan**
 - **Informational briefings on lead role to JPL and DFRC (11/99 - 1/00)**
 - **Meetings with ISE & SMOs (11/99 - Present)**
 - **IPAO must have the MOU signed before assuming its lead role**



ORGANIZATIONAL OVERVIEW

MISSION

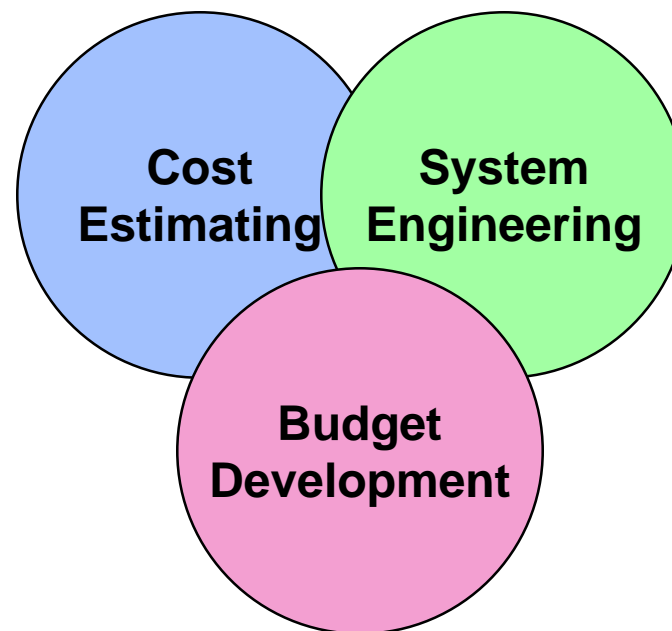
The mission of the NASA Cost Analysis organization is to provide superior customer-measured quality service, analytical innovation, and high quality, motivated people in the performance of the cost analysis function.

IPAO's mission is to identify and implement state of the art processes and capabilities that will facilitate establishing a comprehensive cost estimating capability at NASA



OBJECTIVES

Identify & recommend state of the art processes and tools that will provide full spectrum Cost Estimating services to NASA Management



- Update current tools and metrics
- Eliminate redundant processes
- Establish common processes based on accepted cost estimating principles
- Improve the cost analysis competency
- Improve data integrity through integrated electronic processes

Improve NASA's cost estimating and analysis capability



APPROACH

Complete development and implementation of a Cost Analysis Competency Improvement Plan

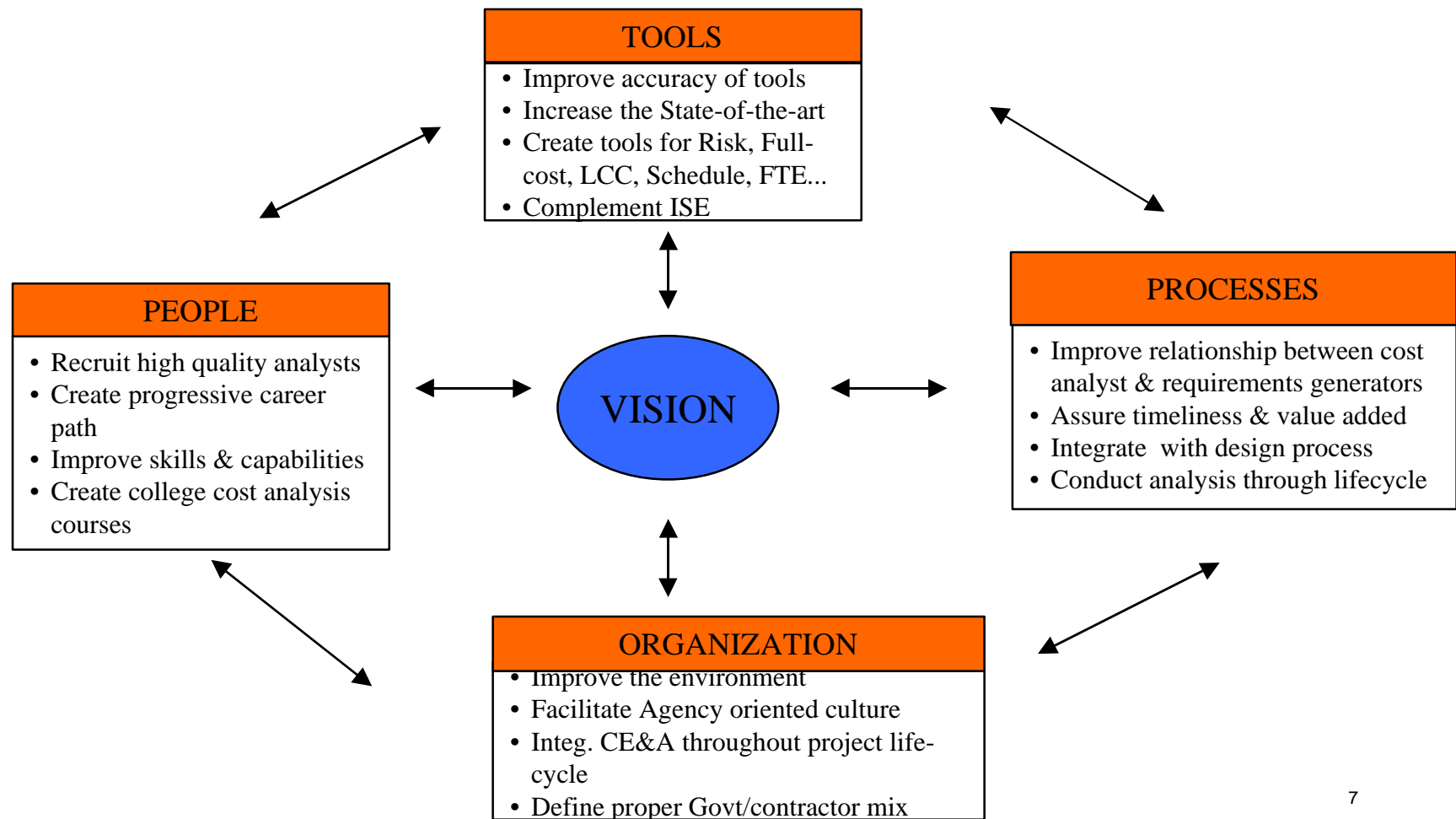
- **Ensure consistency with NASA's strategic plan**
- **Ensure that the four core areas identified by the NASA Cost Analysis Steering Committee (CASC) are addressed**
- **Establish the Cost Analysis Improvement Working Group**
- **Coordinate with other Government Agencies, ESA, and Industry cost analysis organizations**
- **Ensure "buy-in" from all Center's and Headquarters management on recommended improvements**

Benchmark the organizations, processes, and tools used by NASA, Industry & Other Government Agencies



APPROACH (CONT'D)

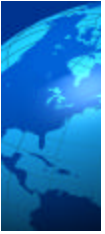
Focus on improvement by area of the Strategic Thrusts in the CASC plan





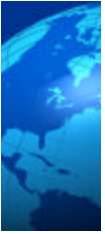
Tools - Needed Improvements

- **Improve the accuracy of existing tools**
 - Create an inventory of tools and make tools available to all Centers
 - Calibrate the tools to the “New ways of doing business”
- **Increase the State-of-the-Art of cost models**
 - Integrate development and operation cost models
 - Work with the Information Systems program at ARC on cost models
 - Continue the development of Operation Cost Models
 - Increase NASA databases and change from “Ad Hoc” management
 - Develop realistic inflation predictors
- **Create tools for Risk Analysis, Full Cost estimates, Life-Cycle Cost estimates, Schedule Analysis, and FTE cost est.**
- **Complement ISE - Tools must work within ISE and remove barriers to collaboration between Center cost groups**



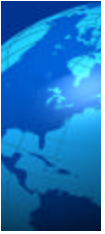
People - Enhance Professionalism

- **Recruit high quality analysts**
 - Identify and maintain the interest of sources of “New blood”
 - Network with the professional cost estimator societies
- **Create a progressive career path**
 - Establish formal growth ladder
 - Increase opportunities to SES level
- **Improve skills and capabilities**
 - Encourage increased formal training
 - Provide “On the job” training and enhanced experiences
- **Create college cost analysis courses**
 - Work with Virginia universities to create a cost analysis course that can be a template for colleges across the country
 - Improve cost analysis introduction to engineers while in college



Organization - Make “World Class”

- **Improve the environment**
 - Develop an environment where cost analysts are not the enemy
 - Work with the projects to create an environment where the analyst's opinions are valuable and should be sought out
- **Facilitate Agency oriented culture**
 - Increase collaboration of cost estimates on high visibility projects
 - Develop cost models and tools through joint development efforts
- **Integrate Cost Estimation & Analysis throughout the project life-cycle**
 - Work concurrent with the project management through the entire lifecycle
 - Assure sufficient resources (people & funds) to respond to requests for services
- **Define proper mix of government & contractor estimators**



Processes - Improve the Stature

- **Improve the working relationship between the cost analyst and personnel who generate requirements**
 - Educate the scientific and engineering communities on the drivers, sensitivities, and risks associated with the costs of requirements
 - Cost analysts should be an integral part of Design Center activities
- **Assure timeliness and value added**
 - Increase interaction with the project management team
 - Establish agreements with management on when services and products will be delivered
- **Integrate with design process**
 - Participate in technology selections and trade studies
 - Continue support to the ISE-CRMT activities
- **Make cost estimating a life-cycle activity**



APPROACH (CON'D)

NASA Cost Estimating and Analysis Improvement plans

- **Continue IPAO lead role formulation**
 - MOU updated and signed - ASAP
 - IPAO staff recruitment - ASAP
- **Conduct the NASA Cost Estimating Organizational Review (Benchmarking): April 00 - TBD**
 - Phase 1A (completed in Oct 99) is the development of the questionnaire and criteria to assess and document the current tools and processes used by NASA, industry and other govt. agencies
 - Provide an overview presentation at the 2000 Cost Symposium
- **Complete the development of the Cost Analysis Competency Improvement Plan: April 00 - June 00**
- **Perform the Cost Research Activities: June 00 - Sept 00**



APPROACH (CONT'D)

The Organizational Review or Benchmarking will be done in four phases

Phase	Achievements	Technique	Deliverable
PHASE IB: Data Collection <i>Mar 00 - May 00</i>	<ul style="list-style-type: none">• “As Is” assessment and gap analysis• Future Vision shared by management	<ul style="list-style-type: none">• Benchmarking• Environmental Scan• Interviews• Literature Reviews	<ul style="list-style-type: none">• As-Is Assessment (Process, Tools)• Initial Best Practice Comparisons• Quick Wins• Preliminary Cost/Benefit Analysis
PHASE II: Process Redesign <i>Jun 00 - Aug 00</i>	<ul style="list-style-type: none">• Management approval of To-Be design concept• Final “green light” from Management	<ul style="list-style-type: none">• Balanced Business Scorecard• Process Mapping• Challenge Sessions• Plateau Planning	<ul style="list-style-type: none">• To-Be Process Overview• Process Model• IT System Requirements• Refined Cost/Benefit Analysis
PHASE III: Implement Prototype <i>Sep 00 - Mar 01</i>	<ul style="list-style-type: none">• Build and test new system• Management declares expected results are achieved	<ul style="list-style-type: none">• Business Solution Rollout• Learning Program• Support Structure• Performance Feedback	<ul style="list-style-type: none">• Production System• Migration Plan• Implementation
PHASE VI: Full Implementation <i>Apr 01 - TBD</i>	<ul style="list-style-type: none">• Implement system throughout NASA• Position NASA for ongoing performance improvement	<ul style="list-style-type: none">• System Implementation• System Testing• User Training• Performance Feedback	<ul style="list-style-type: none">• Continuous Improvement Program• Execution

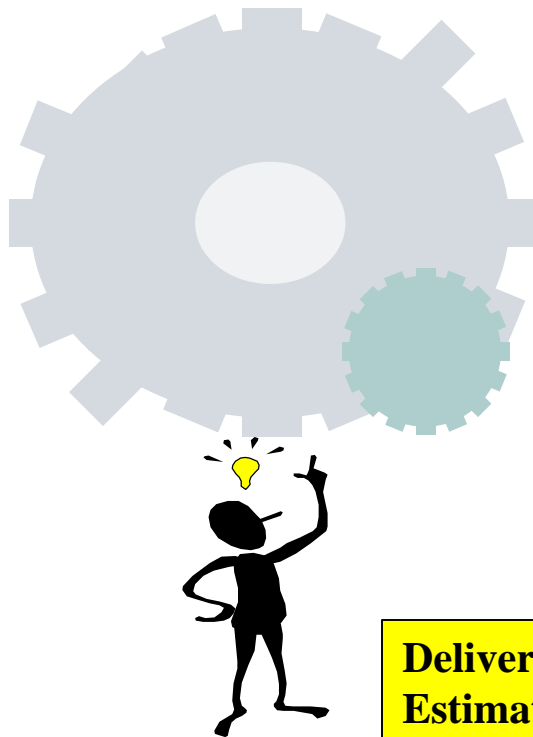


APPROACH (CONT'D)

Phase I: Data Collection

During this phase we will determine how the cost estimating operations at NASA compare to comparable industry standards:

- Benchmark the cost estimating organization, processes and tools at selected NASA Centers
- Benchmark the cost estimating organization, processes, and tools at selected Federal agencies
- Conduct an “As Is” analysis and GAP analysis to:
 - Compare cost estimating tools and processes within the agency,
 - Compare agency organization and processes to current industry practices,
 - Define organization strengths and weaknesses, and
 - Identify “Quick Fixes”



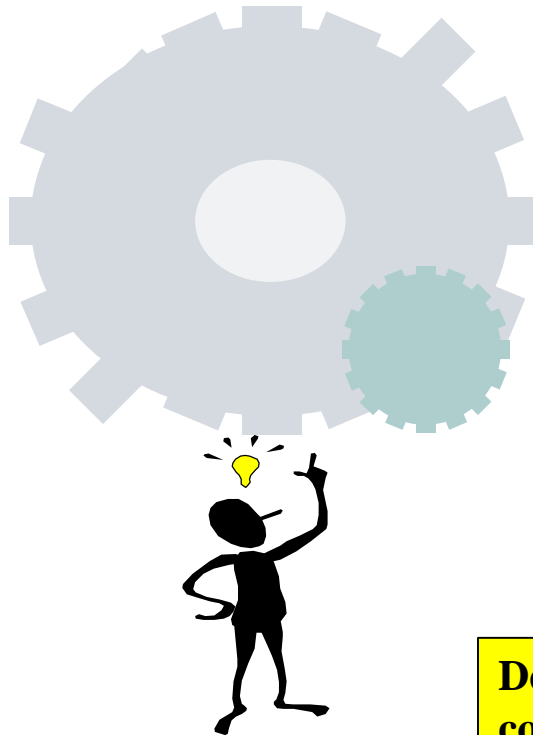
Deliverable: Report; Comparative analysis between NASA Cost Estimating Practices and Current Industry Practices



APPROACH (CONT'D)

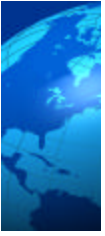
Phase II: Process Redesign

During this phase we will identify how the current NASA cost estimating and analysis organization can be redesigned into a “world class” organization that meets agency and center objectives in a standardized and efficient manner.



- Determine applicability of current industry “best practice” cost estimating tools and processes to NASA
- Redesign the process using best practices to:
 - ✱ Ensure current cost estimating tools and processes are being used
 - ✱ Ensure Agency, Center, and Program requirements are met
 - ✱ Ensure process generates quick, accurate and validate cost estimates
 - ✱ Create consistency in cost estimating techniques and formats
 - ✱ Fully integrate cost estimating with other processes
- Map “To-Be” Process
- Cost/ Benefit Analysis

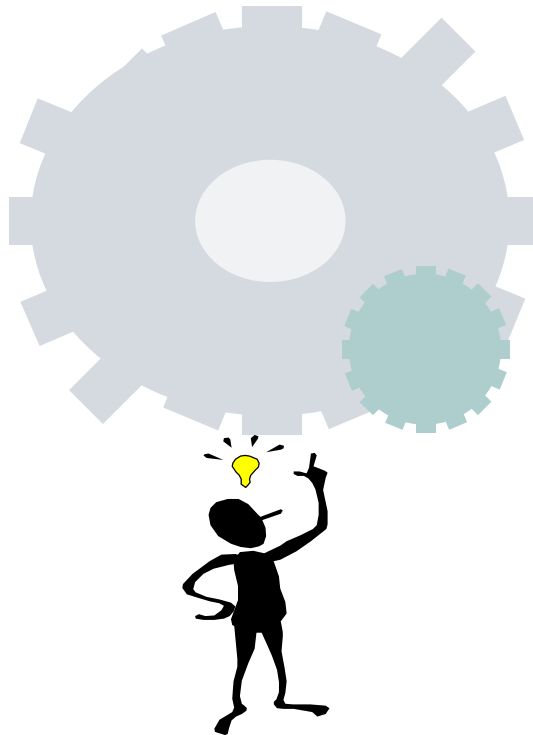
Deliverable: Report; Proposed NASA cost estimating and cost analysis process



APPROACH (CONT'D)

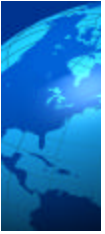
Phase III: Develop Prototype System

During this phase we will implement prototype cost estimating and cost analysis process and tools at selected Centers to test the feasibility of the redesigned process.



- Apply redesigned processes and tools to selected Centers and programs
- Validate the processes and tools as providing greater value than existing processes
- Incorporate lessons learned
- Document Policy and Procedures

Lets test the system and make it work

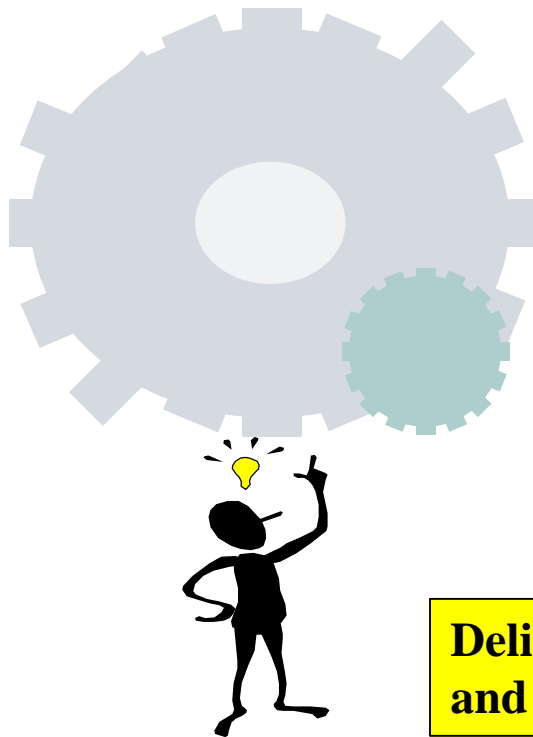


APPROACH (CONT'D)

Phase IV: Full Scale Implementation

During this phase we will implement the new processes and tools throughout NASA.

- Perform agency review of the prototype process and validate
- Perform demonstration to all NASA agencies
- Document and implement within all NASA programs

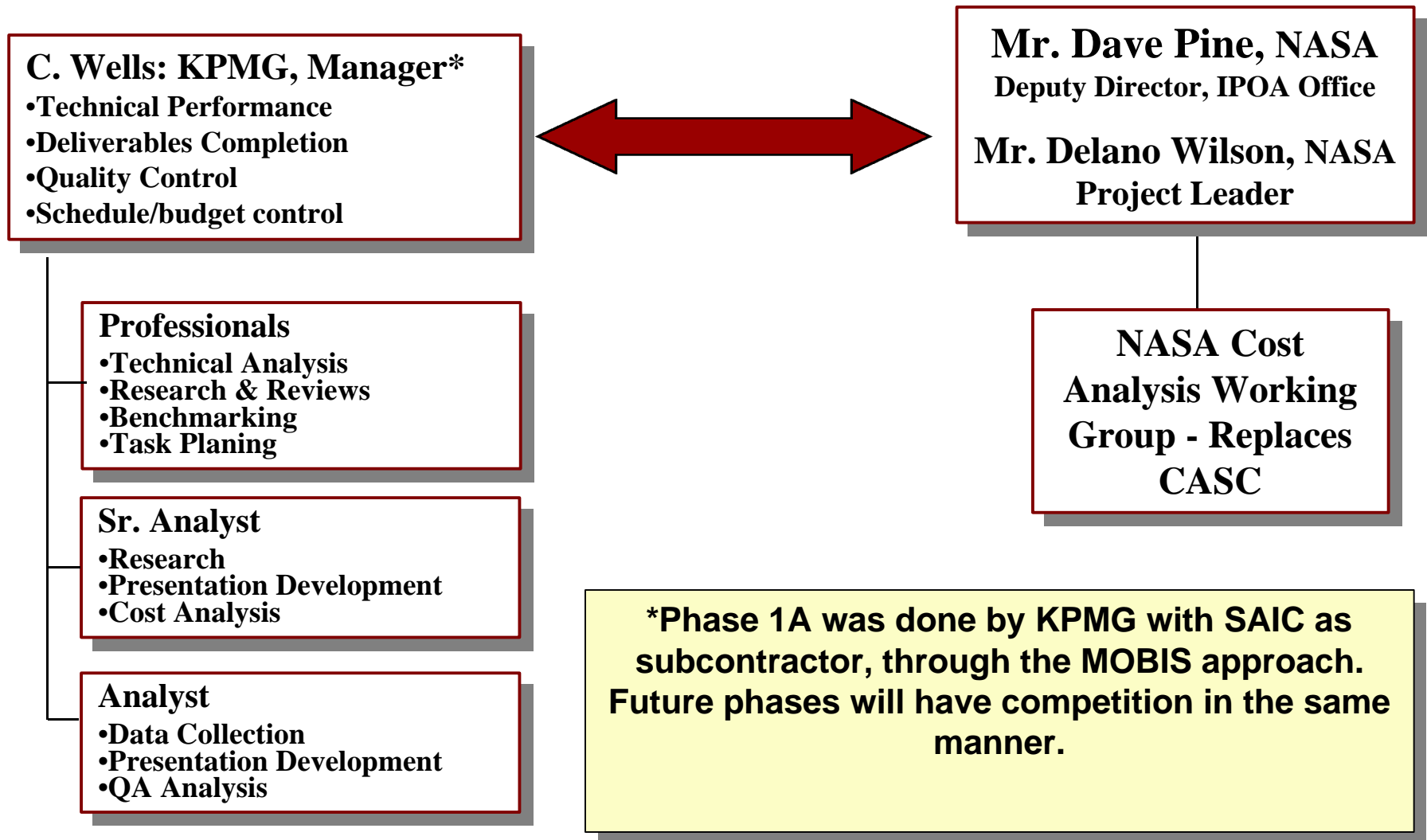


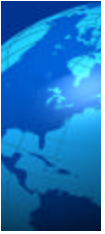
Deliverable: A fully integrated, common cost estimating and cost analysis process throughout NASA



MANAGEMENT

Benchmarking Project Team





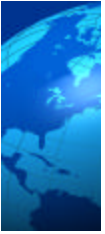
Cost Research Activities

- **Full Cost Estimation Study: 6/00 - TBD**
 - **Manpower Cost Model development**
 - **CERs to generate cost elements not available from cost models**
 - **Full Cost Database development though work with IFMP**
- **Space Operations Cost Model (SOCM) update: On-going**
- **NAFCOM Improvements: On-going**
- **Integration of Development and Operations Cost Models: Underway**
- **Inflation Cost Tool development: 7/00 - 9/00**
- **Development of Cost Estimating & Analysis course as a template for universities across the nation: 9/00 - TBD**
- **Cost Analyst Career Path and Training Plans development: 6/00 - TBD**



Accomplishments-to-Date

- **Draft Cost Analysis Competency Improvement Plan**
 - Significantly reduced in number of pages
 - Updated to include the System Management Offices
- **IPAO lead role formulation**
 - Working with Personnel on Vacancy Announcements
 - Joined the CoSTER, inter-agency organization
 - Sponsored the 2000 Cost Estimators Symposium
- **Benchmarking Project**
 - Development of the NASA Cost Estimating Organizational Review Booklet completed (Phase 1A)
 - Draft Statement of Work for Phase 1B is completed
- **Cost Research Activities**
 - Work on integration of development & operations models underway
 - NAFCOM 99 documentation and user's manual distributed



NEXT STEPS

Benchmarking Project

- **Contract Actions are required**
 - **Request For Quote will be sent out by Procurement**
 - **Responses will be evaluated and a contractor selected**
 - **Purchase Order Agreement will be issued by Procurement**
- **Plans and booklet will be reviewed with Cost Analysis Working Group to obtain “buy-in” and participation**
- **Phase 1B (Data Collection) is planned to start 4/1/00**

Cost Analysis Competency Improvement Plan

- **Incorporate the findings from the benchmarking project**
- **Complete the next draft and review with cost community**

**Continue IPAO lead role (assumes MOU signature obtained)
and develop details of cost research activity plans**